5. Gregory

Program Name: Gregory.java **Input File: gregory.dat**

Gregory is fascinated with Web sites that display a password strength for new passwords. He has developed a new scoring algorithm of his own and needs help to code a solution. To help with this process, he found a designation of the occurrence frequency of letters in the English Oxford Living Dictionaries (en.oxforddictionaries.com), indicated by the alphabet string **`EARIOTNSLCUDPMHGBFYWKVXZJQ`**. This designation declares the letter E as the most often occurring letter in English words, A next, and Q the least often occurring letter.

The scoring rules of his process are as follows:

- Match any of the top 100 common passwords, regardless of letter case, results in score of 0
- Does not contain at least 3 of 4 character categories: lowercase letters, uppercase letters, digits, or special characters, results in score of 0
- Length less than 8 characters results in score of 0
- Passwords not excluded by the above criteria are scored based on content
- Letters, regardless of case, found in the **first** half of the highest-to-lowest frequency list earn 1 point each
- Letters, regardless of case, found in the **last** half of the highest-to-lowest frequency list earn 2 points each
- Digits earn 2 points each
- Special characters earn 3 points each
- Lengths greater than 8 characters earn +2 bonus points for each extra character
- Using all 4 categories (uppercase, lowercase, digits, special characters) earns +5 bonus points
- Category change between sequential characters (e.g., letter to digit, uppercase to lowercase, etc.) earns +2 bonus points for each change. "`UiL`" as part of a password would earn +2 bonus points each for "`Ui`" and "`iL`" case changes and "`u-n`" would earn +2 bonus points each for "`u-`" and "`-n`".
- Immediately repeated characters, of same case for letters, earn a −1 point penalty for each repetition. "`sss`" as part of a password would earn 3 points for the individual letters but get penalized −2 points each for the second and third '`s`'.
- A sequence of 3 consecutive letters of the same case or digits (e.g., "`abc`", "`DEF`", "`789`", etc.) earn −5 penalty points for each sequence

Examples:

- "`password`" and "`Qwerty123`" score 0 since they are in list of most common passwords
- "`pass1234`" scores 0 since it contains only 2 categories of characters: lowercase and digits
- "`fgh123$`" scores 0 since it is less than 8 characters
- "`0circleS`" scores 13 points total: 9 points for characters with +4 bonus points for 2 category changes "`0c`" and "`eS`"
- "`UiL+2019`" scores 27 points total: 14 points for characters with +13 bonus points for using characters from all 4 categories and 4 category changes "`Ui`", "`iL`", "`L+`", and "`+2`"
- "`u20-IL_19`" scores 34 points total: 17 points for characters with +17 bonus points for 2 extra characters and using characters from all four categories, and for 5 category changes "`u2`", "`0-`", "`-I`", "`L_`", and "`_1`"
- "`Sssssss0`" scores 8 points total: 9 points for characters with +4 bonus points for 2 category changes and −5 penalty points for 5 repeated lowercase '`s`' after the initial lowercase '`s`'
- "`N000000s`" scores 13 points total: 14 points for characters with +4 bonus points for 2 category changes and −5 penalty points for 5 repeated '`0`' after the initial '`0`'
- "`Pass12345`!" scores 16 points total: 17 points for characters with +15 bonus points for using characters from all 4 categories, 3 category changes, and 2 extra characters; with −16 penalty points, −1 for repeated '`s`' and −5 points each for "`123`", "`234`", and "`345`"
- "`Abcdefg0`" score -4 points total: 12 points for characters with +4 bonus points for 2 category changes and -20 penalty points for "`bcd`", "`cde`", "`def`", and "`efg`"

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Gregory (cont.)
Strength ratings based on total scores:

- 0 points and lower → UNACCEPTABLE
- 1 – 15 points → WEAK
- 16 – 30 points → FAIR
- 31 – 45 points → GOOD
- 41 points and higher → STRONG

Input: First line contains the letters A…Z, with no spacing and in uppercase, in highest-to-lowest frequency of occurrence according to the English Oxford Living Dictionaries (en.oxforddictionaries.com). Second line contains allowable special characters. The next ten lines contain the 100 mostly commonly used passwords for 2018 in decreasing order (teamsid.com). There are ten passwords per line separated by commas. The remaining lines contain one password per line to be rated for strength. Passwords will not contain spaces or commas and will not exceed 20 characters in length.

Output: For each password, one line of output with the password followed by a colon ':' followed by the calculated score and another colon ':' followed by the strength rating. There must be no additional spacing.

Sample input:
```
EARIOTNSLCUDPMHGBFYWKVXZJQ
`~!@#$%^&*()-_=+[{]}\|;:'"<.>/?
123456,password,123456789,12345678,12345,111111,1234567,sunshine,qwerty,iloveyou
princess,admin,welcome,666666,abc123,football,123123,monkey,654321,!@#$%^&*
charlie,aa123456,donald,password1,qwerty123,zxcvbnm,121212,bailey,freedom,shadow
passw0rd,baseball,buster,daniel,hannah,thomas,summer,george,harley,222222
jessica,ginger,letmein,abcdef,solo,jordan,55555,tigger,joshua,pepper
sophie,1234,robert,matthew,12341234,andrew,lakers,andrea,1qaz2wsx,starwars
ferrari,cheese,computer,corvette,mercedes,blahblah,maverick,hello,nicole,hunter
1989,amanda,1990,jennifer,banana,chelsea,ranger,1991,trustno1,merlin
cookie,ashley,bandit,killer,aaaaaa,1q2w3e,zaq1zaq1,test,hockey,dallas
whatever,admin123, asdf-123,liverpool,querty,william,soccer,london,1992,biteme
password
Qwerty123
pass1234
fgh123$
0circleS
UiL+2019
u20-IL_19
Sssssss0
N000000s
Pass12345!
Abcdefg0
jfm2amj0^jas1ond9
```

Sample output:
```
password:0:UNACCEPTABLE
Qwerty123:0:UNACCEPTABLE
pass1234:0:UNACCEPTABLE
fgh123$:0:UNACCEPTABLE
0circleS:13:WEAK
UiL+2019:27:FAIR
u20-IL_19:34:GOOD
Sssssss0:8:WEAK
N000000s:13:WEAK
Pass12345!:16:FAIR
Abcdefg0:-4:UNACCEPTABLE
jfm2amj0^jas1ond9:63:STRONG
```